California Regional Water Quality Control Board
North Coast Region

MONITORING AND REPORTING PROGRAM NO. R1-2001-45

FOR

PACIFIC GAS & ELECTRIC COMPANY
HUMBOLDT BAY POWER PLANT

Humboldt County

MONITORING

EFFLUENT MONITORING

A sample shall be collected from each of the following waste streams and analyzed as described below:

Waste Stream	Constituent	Sampling Frequency
001 Combined Discharge [a]	Suspended Solids	Monthly
	Oil & Grease	Monthly
	pH	Monthly
	Dissolved Oxygen	Monthly
	Total Copper	Annually
	Dissolved Copper	Annually
	Total Iron	Annually
001B O/W Separators	Suspended Solids	Monthly
	Oil & Grease	Monthly
001C Boiler Metal Cleaning Waste	Suspended Solids	Once during each batch discharge
	Oil & Grease	Once during each batch discharge
	Total Copper	Once during each batch discharge
	Dissolved Copper	Once during each batch discharge
	Total Iron	Once during each batch discharge
	pH	Once during each batch discharge
001D Boiler Fireside Wash	Suspended Solids	Once during each batch discharge
	Oil & Grease	Once during each batch discharge
	Total Copper	Once during each batch discharge
	Dissolved Copper	Once during each batch discharge
	Total Iron	Once during each batch discharge
	pH	Once during each batch discharge

[a] The oil and grease, pH, and dissolved oxygen samples shall be grab samples, the suspended solids and metals samples shall be 24-hour composite samples.

001E Liquid Low-Level Radioactive Waste	Suspended Solids	Weekly
	Oil & Grease	Weekly
	pH	Weekly
001H Boiler Blowdown, Evaporator Blowdown, And Scale Cracking	Suspended Solids	Monthly
	Oil & Grease	Monthly
	pH	Monthly
003A, B,C, D and 004A, B, C	Suspended Solids	Two storm events which produce significant storm water discharge during the wet season (October through April)
	pH	
	Oil & Grease	

RECEIVING WATER MONITORING

Representative samples shall be collected of Humboldt Bay in an ambient background location in the vicinity of the discharge and of Humboldt Bay beyond the zone of initial dilution in the vicinity of the discharge. Samples shall be collected monthly at the same time as Discharge Serial 001 (combined discharge) and shall be analyzed for pH, turbidity, and dissolved oxygen.

SPILL MONITORING

Report the following at a minimum: time of spill, duration of event, duration of discharge, flow rate of affected discharge point to canal, flow rate of Discharge 001A, cause, and response to release.

TOXICITY MONITORING

1. Acute Toxicity Monitoring Requirements

   a. Sampling. The permittee shall collect 24-hour composite samples of combined Discharge Serial No. 001 for acute toxicity testing. For toxicity tests requiring renewals, 24-hour composite samples collected on consecutive days are required.

   b. Frequency.

      (1) Routine Monitoring: Once per year
      (2) Accelerated Monitoring: Twice per year, or as otherwise specified by the Executive Officer.

   c. Conditions for Accelerated Monitoring. The permittee shall conduct accelerated monitoring when the acute toxicity permit limitation is exceeded.

   d. Methodology.

      i. Sample collection, handling and preservation shall be in accordance with *Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms* (EPA 600/4-90-027F, 4th edition or subsequent editions), or as approved by the Executive Officer.

ii. A concurrent reference toxicant test (control sample) shall be performed for each test. In the event that the control survival is less than 90 percent, a new sample shall be collected within 14 days, and the test shall be repeated.

2. Chronic Toxicity Monitoring Requirements

Sampling. The permittee shall collect 24-hour composite samples of combined Discharge Serial No. 001 for critical life stage toxicity testing as indicated below. For toxicity tests requiring renewals, 24-hour composite samples collected on consecutive days are required.

a. Test Species. Chronic toxicity shall be monitored by using critical life stage test(s) and the most sensitive test specie(s) identified by screening phase testing described in (c), below. Test specie(s) shall be approved by the Executive Officer. Two test species may be required if test data indicate that there is alternating sensitivity between the two species.

b. Chronic Toxicity Screening Phase Requirements.

i. The permittee shall perform screening phase monitoring upon adoption of this Monitoring and Reporting Program, and subsequent to any significant change in the nature of the effluent discharged through changes in sources or treatment, except those changes resulting from reductions in pollutant concentrations attributable to pretreatment, source control, and waste minimization efforts.

ii. Design of the screening phase shall, at a minimum, consist of the following elements:

1. At least three test species with approved test protocols shall be used to measure compliance with the toxicity objective;
2. If possible, the test species shall include a vertebrate, an invertebrate, and an aquatic plant;
3. Use of test species specified in Table 1 (below), and use of the protocols referenced in that table, or as approved by the Executive Officer;
4. Appropriate controls; and
5. Concurrent reference toxicant tests.

iii. After two test rounds, the permittee may request an end to the screening phase. The Executive Officer will select the most sensitive species on which to require future chronic toxicity testing.

c. Frequency.

(1) Routine Monitoring:	Once per year
(2) Accelerated Monitoring:	Twice per year, or as otherwise specified by the Executive Officer.

d. Conditions for Accelerated Monitoring. The permittee shall conduct accelerated monitoring when the chronic toxicity permit limitation is exceeded.

e. Methodology. Sample collection, handling and preservation shall be in accordance with U.S. EPA protocols. The test methodology used shall be in accordance with the references cited below, or as approved by the Executive Officer. A concurrent reference toxicant test shall be performed for each test.

TABLE 1

Short-term Methods for Estimating Chronic Toxicity - Saltwater[b]

Species	Scientific Name	Effect	Tier[c]	Reference
giant kelp	*Macrocystis pyrifera*	percent germination; germ tube length	1	1, 3
red abalone	*Haliotis rufescens*	abnormal shell development	1	1, 3
oyster	*Crassostrea gigas*	abnormal shell development; percent survival	1	1, 3
mussels	*Mytilus spp*	abnormal shell development; percent survival	1	1, 3
Urchin, sand dollar	*Strongylocentrotus purpuratus, Dendraster excentricus*	percent normal development	1	1, 3
Urchin, sand dollar	*Strongylocentrotus purpuratus, Dendraster excentricus*	percent fertilization	1	1, 3
shrimp	*Holmesimysis costata*	percent survival; growth	1	1, 3
shrimp	*Mysidopsis bahia*	percent survival; growth; fecundity	2	2, 4
topsmelt	*Antherinops affinis*	larval growth rate; percent survival	1	1, 3
silversides	*Menidia beryllina*	larval growth rate; percent survival	2	2, 4

Toxicity Test References:

1. Chapman, G.A., D.L. Denton, and J.M. Lazorchak. 1995. Short-term methods for estimating the chronic toxicity of effluents and receiving waters to west coast marine and estuarine organisms. U.S. EPA Report No. EPA/600/R-95/136.
2. Klemm, D.J., G.E. Morrison, T.J. Norberg-King, W.J. Peltier, and M.A. Heber. 1994. Short-term methods for estimating the chronic toxicity of effluents and receiving water to marine and estuarine organisms. U.S. EPA Report No. EPA-600-4-91-003.
3. SWRCB 1996. Procedures Manual for Conducting Toxicity Tests Developed by the Marine Bioassay Project. 96-1WQ.
4. Weber, C.I., W.B. Horning, I.I., D.J. Klemm, T.W. Nieheisel, P.A. Lewis, E.L. Robinson, J. Menkedick and F. Kessler (eds). 1988. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms. EPA/600/4-87/028. National Information Service, Springfield, VA.

[b] For waters in which the salinity is equal to or greater than 10 parts per thousand 95 percent or more of the time, the applicable criteria are the saltwater criteria in the CTR.

[c] The first tier test methods are the preferred toxicity tests for compliance monitoring. The Regional Water Board can approve the use of a second tier test method for waste discharges if first tier organisms are not available.

DETERMINATION OF PRIORITY POLLUTANTS REQUIRING WATER QUALITY-BASED EFFLUENT LIMITATIONS

1. Ambient Background Concentrations Monitoring. The effluent receiving water shall be analyzed for priority toxic pollutants listed in Table 2 and shall be done in accordance with Special Provision 1 of Order No. R1-2001-##*. This shall be done during average flows and above the influence of the discharge point. Hardness and pH of the receiving water shall be analyzed and reported at the same time a priority pollutant is analyzed.

2. Effluent Characterization Monitoring. Effluent monitoring for priority toxic pollutants listed in Table 2 below shall be done in accordance with Special Provision 2 of Order No. R1-2001-##*.

3. Monitoring Protocols. The following protocols shall be observed in the execution of the monitoring described above:

   a. The permittee shall use the test methods listed in Table 2, where no test method is listed, methods shall be approved by Regional Water Board staff.
   b. Laboratories analyzing monitoring samples shall be certified by the Department of Health Services, in accordance with the provisions of Water Code Section 13176, and must include quality assurance/quality control data with their reports.
   c. Permittees are to instruct laboratories to establish calibration standards so that the Minimum Level (ML) value (or its equivalent if there is different treatment of samples relative to calibration standards) is the lowest calibration standard. At no time shall the permittee use analytical data derived from *extrapolation* beyond the lowest point of the calibration curve.

TABLE 2

Minimum Levels for Priority Toxic Pollutants

CTR #	CAS #	Constituent (a)	Minimum Level (µg/l) (b)										
			GC	GCMS	LC	Color	FAA	GFAA	ICP	ICP MS	SPGFAA	HYD RIDE	CVAA
1.	7440360	Antimony					10	5	50	0.5	5	0.5	
2.	7440382	Arsenic				20		2	10	2	2	1	
3.	7440417	Beryllium					20	0.5	2	0.5	1		
4.	7440439	Cadmium				10	0.5	10	0.25	0.5			
5a.	16065831	Chromium (total) (c)					50	2	10	0.5	1		
5b.	18540299	Chromium (VI)				10	5						
6.	7440508	Copper					25	5	10	0.5	2		
7.	7439921	Lead					20	5	5	0.5	2		
8.	7439976	Mercury								0.5			0.2
9.	7440020	Nickel					50	5	20	1	5		
10.	7782492	Selenium						5	10	2	5	1	
11.	7440224	Silver					10	1	10	0.25	2		
12.	7440280	Thallium					10	2	10	1	5		
13.	7440666	Zinc					20		20	1	10		
14.	57125	Cyanide				5							

CTR #	CAS #	Constituent (a)	Minimum Level (µg/l) (b)										
			GC	GCMS	LC	Color	FAA	GFAA	ICP	ICP MS	SPGFAA	HYD RIDE	CVAA
15.	1332214	Asbestos (c)											
16.	1746016	2, 3, 7, 8-TCDD (Dioxin) (c, e)											
17.	107028	Acrolein	2.0	5									
18.	107131	Acrylonitrile	2.0	2									
19.	71432	Benzene	0.5	2									
20.	75252	Bromoform	0.5	2									
21.	56235	Carbon Tetrachloride	0.5	2									
22.	108907	Chlorobenzene	0.5	2									
23.	124481	Chlorodibromomethane	0.5	2									
24.	75003	Chloroethane	0.5	2									
25.	110758	2-Chloroethylvinyl Ether	1	1									
26.	67663	Chloroform	0.5	2									
27.	75274	Dichlorobromomethane	0.5	2									
28.	75343	1,1-Dichloroethane	0.5	1									
29.	107062	1,2-Dichloroethane	0.5	2									
30.	75354	1, 1-Dichloroethylene	0.5	2									
31.	78875	1, 2-Dichloropropane	0.5	1									
32.	542756	1, 3 – Dichloropropylene	0.5	2									
33.	100414	Ethylbenzene	0.5	2									
34.	74839	Methyl Bromide	1.0	2									
35.	74873	Methyl Chloride	0.5	2									
36.	75092	Methylene Chloride	0.5	2									
37.	79345	1,1,2,2-Tetrachloroethane	0.5	1									
38.	127184	Tetrachloroethylene	0.5	2									
39.	108883	Toluene	0.5	2									
40.	156605	1,2-Trans-Dichloroethylene	0.5	1									
41.	71556	1,1,1-Trichloroethane	0.5	2									
42.	79005	1,1,2-Trichloroethane	0.5	2									
43.	79016	Trichloroethylene	0.5	2									
44.	75014	Vinyl Chloride	0.5	2									
45.	95578	2-Chlorophenol	2	5									
46.	120832	2,4-Dichlorophenol	1	5									
47.	105679	2,4-Dimethylphenol	1	2									
48.	534521	2-Methyl-4,6-Dinitrophenol	10	5									
49.	51285	2,4-Dinitrophenol	5	5									
50.	88755	2-Nitrophenol		10									
51.	100027	4-Nitrophenol	5	10									
52.	59507	3-Methyl-4-Chlorophenol	5	1									
53.	87265	Pentachlorophenol	1	5									
54.	108952	Phenol	1	1		50							
55.	88062	2,4,6- Trichlorophenol	10	10									
56.	83329	Acenaphthene	1	1	0.5								
57.	208968	Acenaphthylene		10	0.2								
58.	120127	Anthracene		10	2								
59.	92875	Benzidine		5									
60.	56553	Benzo(a)Anthracene	10	5									

CTR #	CAS #	Constituent (a)	Minimum Level (µg/l) (b)										
			GC	GCMS	LC	Color	FAA	GFAA	ICP	ICP MS	SPGFAA	HYD RIDE	CVAA
61.	50328	Benzo(a)Pyrene		10	2								
62.	205992	Benzo(b)Fluoranthene		10	10								
63.	191242	Benzo(ghi)Perylene		5	0.1								
64.	207089	Benzo(k)Fluoranthene		10	2								
65.	111911	Bis(2-Chloroethoxy) Methane		5									
66.	111444	Bis(2-Chloroethyl) Ether	10	1									
67.	39638329	Bis(2-Chloroisopropyl) Ether	10	2									
68.	117817	Bis(2-Ethylhexyl) Phthalate	10	5									
69.	101553	4-Bromophenyl Phenyl Ether	10	5									
70.	85687	Butylbenzyl Phthalate	10	10									
71.	91587	2-Chloronaphthalene		10									
72.	7005723	4-Chlorophenyl Phenyl Ether		5									
73.	218019	Chrysene		10	5								
74.	53703	Dibenzo(a,h) Anthracene		10	0.1								
75.	95501	1, 2 Dichlorobenzene	0.5	2									
76.	541731	1, 3 Dichlorobenzene	0.5	2									
77.	106467	1, 4 Dichlorobenzene	0.5	2									
78.	91941	3,3'-Dichlorobenzidine		5									
79.	84662	Diethyl Phthalate	10	2									
80.	131113	Dimethyl Phthalate	10	2									
81.	84742	Di-n-Butyl Phthalate		10									
82.	121142	2,4-Dinitrotoluene	10	5									
83.	606202	2,6-Dinitrotoluene		5									
84.	117840	Di-n-Octyl Phthalate		10									
85.	122667	1,2-Diphenylhydrazine		1									
86.	206440	Fluoranthene	10	1	0.05								
87.	86737	Fluorene		10	0.1								
88.	118741	Hexachlorobenzene	5	1									
89.	87683	Hexachlorobutadiene	5	1									
90.	77474	Hexachlorocyclopentadiene	5	5									
91.	67721	Hexachloroethane	5	1									
92.	193395	Indeno(1,2,3-cd)Pyrene		10	0.05								
93.	78591	Isophorone	10	1									
94.	91203	Naphthalene	10	1	0.2								
95.	98953	Nitrobenzene	10	1									
96.	62759	N-Nitrosodimethylamine	10	5									
97.	621647	N-Nitrosodi-n-Propylamine	10	5									
98.	86306	N-Nitrosodiphenylamine	10	1									
99.	85018	Phenanthrene		5	0.05								
100.	129000	Pyrene		10	0.05								
101.	120821	1,2,4-Trichlorobenzene	1	5									
102.	309002	Aldrin	0.005										
103.	319846	alph-BHC	0.01										
104.	319857	beta-BHC	0.005										

CTR #	CAS #	Constituent (a)	Minimum Level (µg/l) (b)										
			GC	GCMS	LC	Color	FAA	GFAA	ICP	ICP MS	SPGFAA	HYD RIDE	CVAA
105.	58899	gamma-BHC	0.02										
106.	319868	Delta-BHC	0.005										
107.	57749	Chlordane	0.1										
108.	50293	4,4'-DDT	0.01										
109.	72559	4,4'-DDE	0.05										
110.	72548	4,4'-DDD	0.05										
111.	60571	Dieldrin	0.01										
112.	959988	alpha-Endosulfan	0.02										
113.	33213659	beta-Endosulfan	0.01										
114.	1031078	Endosulfan Sulfate	0.05										
115.	72208	Endrin	0.01										
116.	7421934	Endrin Aldehyde	0.01										
117.	76448	Heptachlor	0.01										
118.	1024573	Heptachlor Epoxide	0.01										
119-125		PCBs (d)	0.5										
126.	8001352	Toxaphene	0.5										

Notes:

a.) Factors may be applied to the ML depending on the specific sample preparation steps employed.

b.) Laboratory techniques are defined as follows: GC = Gas Chromatography; GCMS = Gas Chromatography/Mass Spectrometry; LC = High Pressure Liquid Chromatography; Color = Colorimetric; FAA = Flame Atomic Absorption; GFAA = Graphite Furnace Atomic Absorption; Hydride = Gaseous Hydride Atomic Absorption; CVAA = Cold Vapor Atomic Absorption; ICP = Inductively Coupled Plasma; ICPMS = Inductively Coupled Plasma/Mass Spectrometry; SPGFAA = Stabilized Platform Graphite Furnace Atomic Absorption (i.e. EPA 200.9); DCP = Direct Current Plasma.

c.) The SIP does not contain an ML for this constituent.

d.) PCBs refers to PCB 1016, 1221, 1232, 1242, 1248, 1254 and 1260.

e.) Use Method 1613 for TCDD analysis and test for seventeen congeners.

DIOXIN STUDY OF THE EFFLUENT

The permittee shall monitor its effluent for the presence of the seventeen 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) congeners listed below, once during the dry weather and once during the wet weather each year for a period of three consecutive years. This shall be done in accordance with Special Provision 3 of Order No. R1-2001-##*. The congeners and Toxic Equivalent Factors (TEF) are shown in Table 3, below.

TABLE 3[d]

Toxic Equivalency Factors (TEFs) for 2,3,7,8-TCDD Equivalents

Congener	TEF
2,3,7,8-TetraCDD	1
1,2,3,7,8-PentaCDD	1.0
1,2,3,4,7,8-HexaCDD	0.1

[d] Reprinted from *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California*, Table 4.

1,2,3,6,7,8-HexaCDD	0.1
1,2,3,7,8,9-HexaCDD	0.1
1,2,3,4,6,7,8-HeptaCDD	0.01
OctaCDD	0.0001
2,3,7,8-TetraCDF	0.1
1,2,3,7,8-PentaCDF	0.05
2,3,4,7,8-PentaCDF	0.5
1,2,3,4,7,8-HexaCDF	0.1
1,2,3,6,7,8-HexaCDF	0.1
1,2,3,7,8,9-HexaCDF	0.1
2,3,4,6,7,8-HexaCDF	0.1
1,2,3,4,6,7,8-HeptaCDF	0.01
1,2,3,4,7,8,9-HeptaCDF	0.01
OctaCDF	0.0001

REPORTING

Reporting Requirements for Conventional Pollutants.

Quarterly monitoring reports shall be submitted to the Regional Water Board by the 30th day of the month following the quarter, containing the data required by the EFFLUENT MONITORING, RECEIVING WATER MONITORING, and SPILL MONITORING (as necessary) sections above. In reporting the monitoring data, the permittee shall arrange the data in tabular form so that the date, the constituents, and concentrations are readily discernible. The data shall be summarized in such a manner to illustrate clearly the compliance with waste discharge requirements. Additionally, the Pacific Gas & Electric Company shall report any change in the usage, spillage, leakage, or discharge of polychlorinated biphenyl compounds and chlorine at the facility.

Annual reports shall be submitted to the Regional Water Board by February 28th of each year. The report shall contain tabular and graphical summaries of the monitoring data obtained during the previous year. The permittee shall discuss the compliance record, corrective actions taken, and corrective actions which may be needed to bring the discharge into compliance. Comparison of data with respect to historical discharge data and identification of potential changes should be performed.

A copy of the monitoring reports shall be mailed to:

Regional Administrator
Environmental Protection Agency, Region IX
Attn: WTR-7, NPDES/DMR
75 Hawthorne Street
San Francisco, CA 94105

Toxicity Reporting Requirements.

1. The results of the acute toxicity testing shall be provided in the most recent self-monitoring report. Information listed in the "Report Preparation" Section of the U.S. EPA guidance document shall be included in the report. Additionally, a summary table of acute toxicity data from at least four of the most recent samples shall be included. The information in the table shall include the items listed below:

   a. sample date(s)
   b. test initiation date
   c. test species
   d. toxicity test method used
   e. LC_{50}[e] and NOAEC[f] value(s) in percent effluent
   f. mean percent mortality (±s.d.) in 100 percent effluent
   g. percent survival for reference toxicant test(s)
   h. Pass/Fail

   Control survival must be 90 percent or greater for an acceptable test. The test "passes" if survival in the control and effluent concentration equals or exceeds 90 percent. The test "fails" if survival in the effluent is less than 90 percent, and is significantly different from the control survival (which must be 90 percent or greater), as determined by hypothesis testing.

   The results of the chronic toxicity testing shall be provided in the most recent Self-Monitoring Report and shall include a summary table of chronic toxicity data from at least four of the most recent samples. The information in the table shall include the items listed below.

   a. sample date(s)
   b. test initiation date
   c. test species
   d. end point values for each dilution (e.g. number of young, growth rate, percent survival)
   e. NOEC[g] value(s) in percent effluent
   f. TUc[h] values (100/NOEC)
   g. Mean percent mortality (±s.d.) after 96 hours in 100 percent effluent (if applicable)
   h. NOEC values for reference toxicant test(s)
   i. Available water quality measurements for each test (ex. pH, D.O., temperature, conductivity, hardness, salinity, ammonia)

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[e] LC_{50} is the percent effluent that is lethal to 50 percent of the test organisms.

[f] No Observed Adverse Effects Concentration (NOAEC) is the highest effluent concentration at which survival is not significantly different from the control.

[g] No Observed Effects Concentration (NOEC) is the highest tested concentration of an effluent at which no adverse effects are observed on the aquatic test organism.

[h] Chronic Toxicity Unit (Tuc) is the maximum percent effluent that causes no observable effects on a test organism. TUc = 100/NOEC (e.g., if NOEC = 100, then toxicity = 1 TUc)

Determination of Priority Pollutants Requiring Water Quality-Based Effluent Limitations Data Reporting.

1. The permittee shall report the results of analytical determination for the presence of chemical constituents in a sample using the following protocols:

   a) Sample results greater than or equal to the reported ML shall be reported as measured by the laboratory (i.e., the measured concentration in the sample).
   b) Sample results less than the reported ML, but greater than or equal to the laboratory's Minimum Detection Level (MDL, shall be reported as "Detected, but Not Quantified," or DNQ. The estimated chemical concentration of the sample also shall be reported.
   c) For the purposes of data collection, the laboratory shall write the estimated chemical concentration next to DNQ as well as the words "Estimated Concentration" (may be shortened to "Est. Conc."). The laboratory may, if such information is available, include numerical estimates of the data quality for the reported result. Numerical estimates of data quality may be percent accuracy (+/- a percentage of the reported value), numerical ranges (low to high), or any other means considered appropriate by the laboratory.
   d) Sample results less than the laboratory's MDL shall be reported as "Not Detected," or ND.

2. Report shall be submitted after the completion of all phases of the sampling, not later than April 28, 2003.

Dioxin Reporting

The permittee shall report for each congener the analytical results of the effluent monitoring, including the quantifiable limit and the Method Detection Limit, and the measured or estimated concentration. In addition, the permittee shall multiply each measured or estimated congener concentration by its respective TEF value and report the sum of these values. Report shall be submitted no later than three years from the date of adoption of Order No. R1-2001-##*.

Ordered by _____

Lee A. Michlin
Executive Officer

April 26, 2001